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### 1 [Cool-Cache: A compiler-enabled energy efficient data caching framework for embedded/multimedia processors](#)


 Osman S. Unsal, Raksit Ashok, Israel Koren, C. Mani Krishna, Csaba Andras Moritz  
 August 2003 **ACM Transactions on Embedded Computing Systems (TECS)**, Volume 2 Issue 3

Publisher: ACM Press

 Full text available: pdf(834.37 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

The unique characteristics of multimedia/embedded applications dictate media-sensitive architectural and compiler approaches to reduce the power consumption of the data cache. Our goal is exploring energy savings for embedded/multimedia workloads without sacrificing performance. Here, we present two complementary media-sensitive energy-saving techniques that leverage static information. While our first technique is applicable to existing architectures, in our second technique we adopt a more radical ...

**Keywords:** Low-power design, cache partitioning, compiler-architecture interaction, tagless caching

### 2 [Data partitioning and load balancing in parallel disk systems](#)

Peter Scheuermann, Gerhard Weikum, Peter Zabback

 February 1998 **The VLDB Journal — The International Journal on Very Large Data Bases**, Volume 7 Issue 1

Publisher: Springer-Verlag New York, Inc.

 Full text available: pdf(310.27 KB) Additional Information: [full citation](#), [abstract](#), [citations](#), [index terms](#)

Parallel disk systems provide opportunities for exploiting I/O parallelism in two possible ways, namely via inter-request and intra-request parallelism. In this paper, we discuss the main issues in performance tuning of such systems, namely striping and load balancing, and show their relationship to response time and throughput. We outline the main components of an intelligent, self-reliant file system that aims to optimize striping by taking into account the requirements of the applications, an ...

**Keywords:** Data allocation, Disk cooling, File striping, Load balancing, Parallel disk systems, Performance tuning

### 3 [Abstract data types in the Model programming language](#)



Robert T. Johnson, James B. Morris

March 1976 **ACM SIGMOD Record , ACM SIGPLAN Notices , Proceedings of the 1976 conference on Data : Abstraction, definition and structure**, Volume 8 , 11 Issue 2 , SI

**Publisher:** ACM Press

Full text available: [pdf\(806.83 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

The concept of an abstract data type is available in the Model programming language as a proposed improvement to current ideas of programming methodology. In structured programming the principal technique is refinement of procedures. In Model, the analogue is refinement of data types. An abstract data type consists of a data structure and an associated set of operations. The characteristics and suggested uses for this mechanism are discussed. Also presented are several examples culminating ...

**Keywords:** Abstract data types, Data types, Level of abstraction, Parameterized types, Programming abstraction, Reliable programming, Structured programming



#### 4 COOL: kernel support for object-oriented environments

Sabine Habert, Laurence Mosseri

September 1990 **ACM SIGPLAN Notices , Proceedings of the European conference on object-oriented programming on Object-oriented programming systems, languages, and applications OOPSLA/ECOOP '90**, Volume 25 Issue 10

**Publisher:** ACM Press

Full text available: [pdf\(1.04 MB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

The Chorus Object-Oriented Layer (COOL) is an extension of the facilities provided by the Chorus distributed operating system with additional functionality for the support of object-oriented environments. This functionality is realized by a layer built on top of the Chorus V3 Nucleus, which extends the Chorus interface with generic functions for object management: creation, deletion, storage, remote invocation and migration. One major goal of this approach was to explore the feasibility of ...



#### 5 Development and verification of a model for predicting fog over cooling ponds

Robert R. Hippler, Edward Cohen, Orville G. Tranby

January 1974 **Proceedings of the 7th conference on Winter simulation - Volume 1**

**Publisher:** ACM Press

Full text available: [pdf\(547.86 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

At low atmospheric temperatures, between 5°C and -20°C, water evaporated from an open water surface, such as a power plant cooling pond, can cause frequent fog formations. To study the environmental effect of proposed cooling pond designs, a simulation model was developed which provided the following: the amount of water evaporated from the surface of the pond as a function of the pond surface temperatures and atmospheric conditions (the source terms); the diffusion of the water vap ...



#### 6 Geometrically deformed models: a method for extracting closed geometric models from volume data

James V. Miller, David E. Breen, William E. Lorensen, Robert M. O'Bara, Michael J. Wozny

July 1991 **ACM SIGGRAPH Computer Graphics , Proceedings of the 18th annual conference on Computer graphics and interactive techniques SIGGRAPH '91**, Volume 25 Issue 4

**Publisher:** ACM Press

Full text available: [pdf\(2.02 MB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

terms

We propose a new approach to the problem of generating a simple topologically-closed geometric model from a point-sampled volume data set. We call such a model a Geometrically Deformed Model or GDM. A GDM is created by placing a 'seed' model in the volume data set. The model is then deformed by a relaxation process that minimizes a set of constraints that provides a measure of how well the model fits the features in the data. Constraints are associated with each vertex in the model that control ...

**Keywords:** constraint minimization, deformable models, geometric modelling, volume modelling, volume visualization

## 7 Multimedia and graphics: Cool-cache for hot multimedia

Osman S. Unsal, Raksit Ashok, Israel Koren, C. Mani Krishna, Csaba Andras Moritz  
December 2001 **Proceedings of the 34th annual ACM/IEEE international symposium on Microarchitecture**

**Publisher:** IEEE Computer Society

Full text available:  [pdf\(970.61 KB\)](#)

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Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#)


We claim that the unique characteristics of multimedia applications dictate media-sensitive architectural and compiler approaches to reduce the power consumption of the data cache. Our motivation is exploring energy savings for real-time multimedia workloads without sacrificing performance. Here, we present two complementary media-sensitive energy-saving techniques that leverage static information. While our first technique is applicable to existing architectures, in our second technique we adopt ...

## 8 Temperature-aware microarchitecture: Modeling and implementation

Kevin Skadron, Mircea R. Stan, Karthik Sankaranarayanan, Wei Huang, Sivakumar Velusamy, David Tarjan

March 2004 **ACM Transactions on Architecture and Code Optimization (TACO)**, Volume 1 Issue 1

**Publisher:** ACM Press

Full text available:  [pdf\(1.42 MB\)](#)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

With cooling costs rising exponentially, designing cooling solutions for worst-case power dissipation is prohibitively expensive. Chips that can autonomously modify their execution and power-dissipation characteristics permit the use of lower-cost cooling solutions while still guaranteeing safe temperature regulation. Evaluating techniques for this *dynamic thermal management* (DTM), however, requires a thermal model that is practical for architectural studies. This paper describes *HotSpo* ...

**Keywords:** *Dynamic compact thermal models, dynamic thermal management, dynamic voltage scaling, feedback control, fetch gating*

## 9 Model data management: towards a common solution for PDM/SCM systems

Jad El-khoury

September 2005 **Proceedings of the 12th international workshop on Software configuration management SCM '05**

**Publisher:** ACM Press

Full text available:  [pdf\(518.56 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#)

Software Configuration Management and Product Data Management systems have been developed independently, but recently the need to integrate them to support multidisciplinary development environments has been recognised. Due to the difference in

maturity levels of these disciplines, integration efforts have had limited success in the past. This paper examines how the move towards model-based development in software engineering is bringing the discipline closer to hardware development, permitting ...

10 Extending data modeling to cover the whole enterprise



August-Wilhelm Scheer, Alexander Hars

September 1992 **Communications of the ACM**, Volume 35 Issue 9

**Publisher:** ACM Press

Full text available: [pdf\(1.50 MB\)](#) Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)

**Keywords:** analysis, modeling

11 Statistical and probabilistic techniques: Confidence-based data management for personal area sensor networks



Nesime Tatbul, Mark Buller, Reed Hoyt, Steve Mullen, Stan Zdonik

August 2004 **Proceedings of the 1st international workshop on Data management for sensor networks: in conjunction with VLDB 2004 DMSN '04**

**Publisher:** ACM Press

Full text available: [pdf\(384.99 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#)

The military is working on embedding sensors in a "smart uniform" that will monitor key biological parameters to determine the physiological status of a soldier. The soldier's status can only be determined accurately by combining the readings from several sensors using sophisticated physiological models. Unfortunately, the physical environment and the low-bandwidth, push-based personal-area network (PAN) introduce uncertainty in the inputs to the models. Thus the model must produce a confidence ...

12 Analytical models of combining Banyan networks



Arif Merchant

June 1992 **ACM SIGMETRICS Performance Evaluation Review , Proceedings of the 1992 ACM SIGMETRICS joint international conference on Measurement and modeling of computer systems SIGMETRICS '92/PERFORMANCE '92**, Volume 20 Issue 1

**Publisher:** ACM Press

Full text available: [pdf\(636.23 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

We present in this paper an analytical model of a multistage combining Banyan network with output buffered switches, in hot-spot traffic. In a combining network, packets bound for the same destination are combined into one if they meet at a switch; this alleviates the problem of tree-saturation caused by hot-spot traffic. We model the flow processes in the network as Markov chains and recursively approximate the departure processes of each stage of the network in terms of the departure pro ...

13 Volume illustration: non-photorealistic rendering of volume models

David Ebert, Penny Rheingans

October 2000 **Proceedings of the conference on Visualization '00**

**Publisher:** IEEE Computer Society Press

Full text available: [pdf\(268.75 KB\)](#) Additional Information: [full citation](#), [citations](#), [index terms](#)

**Keywords:** illustration, lighting models, non-photorealistic rendering, shading, visualization, volume rendering

#### 14 The ITHACA office object model: modeling and implementation



James S. K. Ang, D. W. Conrath

November 1993 **ACM SIGMIS Database**, Volume 24 Issue 4

**Publisher:** ACM Press

Full text available: pdf(840.73 KB) Additional Information: [full citation](#), [abstract](#), [index terms](#)

This paper presents an object-oriented approach to modeling an office, including both its content and the activities that are carried out within it. This is a part of a larger research effort---the ITHACA Project (Integrated Toolkit for Highly Advanced Computer Applications). Its purpose is to provide software engineers and application programmers with a generic framework within which to develop large, distributed office support systems. The set of interrelated models contains: the active object ...

#### 15 Thermal issues in disk drive design: Challenges and possible solutions



Sudhanva Gurumurthi, Anand Sivasubramaniam

February 2006 **ACM Transactions on Storage (TOS)**, Volume 2 Issue 1

**Publisher:** ACM Press

Full text available: pdf(2.14 MB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

The importance of pushing the performance envelope of disk drives continues to grow in the enterprise storage market. One of the most fundamental factors impacting disk drive design is heat dissipation, since it directly affects drive reliability. Until now, drive manufacturers have continued to meet the 40&percent; annual growth target of the internal data-rates (IDR) by increasing RPMs and shrinking platter sizes, both of which have counteracting effects on the heat dissipation within a drive. ...

**Keywords:** Disk drive, technology scaling, thermal management

#### 16 Thermal Modeling, Characterization and Management of On-Chip Networks

Li Shang, Li-Shiuan Peh, Amit Kumar, Niraj K. Jha

December 2004 **Proceedings of the 37th annual IEEE/ACM International Symposium on Microarchitecture MICRO 37**

**Publisher:** IEEE Computer Society

Full text available: pdf(551.38 KB) Additional Information: [full citation](#), [abstract](#), [citations](#)

Due to the wire delay constraints in deep submicron technology and increasing demand for on-chip bandwidth, networks are becoming the pervasive interconnect fabric to connect processing elements on chip. With ever-increasing power density and cooling costs, the thermal impact of on-chip networks needs to be urgently addressed. In this work, we first characterize the thermal profile of the MIT Raw chip. Our study shows networks having comparable thermal impact as the processing elements and contr ...

#### 17 Adaptive dissemination of data in time-critical asymmetric communication environments

October 2004 **Mobile Networks and Applications**, Volume 9 Issue 5

**Publisher:** Kluwer Academic Publishers

Full text available: pdf(294.82 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

The proliferation of new data-intensive applications in asymmetric communication environments has led to an increasing interest in the development of push-based techniques, in which the information is broadcast to a large population of clients in order to achieve the most efficient use of the limited server and communication resources. It is important to note that quite often the data that is broadcast is time-critical in nature.

Most of the related current research focuses on a pure p ...

**Keywords:** asymmetric communication, broadcast data dissemination, push-based techniques, scheduling, time-critical data

18 Disk Drive Roadmap from the Thermal Perspective: A Case for Dynamic Thermal Management



Sudhanva Gurumurthi, Anand Sivasubramaniam, Vivek K. Natarajan  
May 2005 **ACM SIGARCH Computer Architecture News , Proceedings of the 32nd Annual International Symposium on Computer Architecture ISCA '05**,  
Volume 33 Issue 2

**Publisher:** IEEE Computer Society, ACM Press

Full text available: pdf(243.57 KB) Additional Information: [full citation](#), [abstract](#), [index terms](#)

The importance of pushing the performance envelope of disk drives continues to grow, not just in the server market but also in numerous consumer electronics products. One of the most fundamental factors impacting disk drive design is the heat dissipation and its effect on drive reliability, since high temperatures can cause off-track errors, or even head crashes. Until now, drive manufacturers have continued to meet the 40% annual growth target of the internal data rates (IDR) by increasing RPMs ...

19 Composite model-checking: verification with type-specific symbolic representations



Tevfik Bultan, Richard Gerber, Christopher League  
January 2000 **ACM Transactions on Software Engineering and Methodology (TOSEM)**,  
Volume 9 Issue 1

**Publisher:** ACM Press

Full text available: pdf(400.17 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

There has been a surge of progress in automated verification methods based on state exploration. In areas like hardware design, these technologies are rapidly augmenting key phases of testing and validation. To date, one of the most successful of these methods has been symbolic model-checking, in which large finite-state machines are encoded into compact data structures such as Binary Decision Diagrams (BDDs), and are then checked for safety and liveness properties. However, these technique ...

**Keywords:** Presburger arithmetic, binary decision diagrams, symbolic model-checking

20 COOL: system support for distributed programming



Rodger Lea, Christian Jacquemot, Eric Pillevesse  
September 1993 **Communications of the ACM**, Volume 36 Issue 9

**Publisher:** ACM Press

Full text available: pdf(3.45 MB) Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#), [review](#)

**Keywords:** concurrency, concurrent object-oriented programming

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